

Cellular Divider/Combiner Switches With Low Loss

This innovative assembly cuts signal losses to a minimum when splitting signals or combining multiple cellular power amplifiers.

POWER combiners are a necessary evil in most high-power amplifier designs. In cellular base-station amplifiers, for example, the contributions of multiple lower-power amplifiers are generally summed using power combiners to achieve a high total output level, even though considerable amounts of RF power are often lost in the process. But good news for base-station and amplifier designers alike has surfaced in the form of a low-loss switchable power divider/combiner from Narda Microwave-East (Hauppauge, NY). The assembly exhibits 0.5-dB or less combiner loss for cellular applications from 869 to 894 MHz.

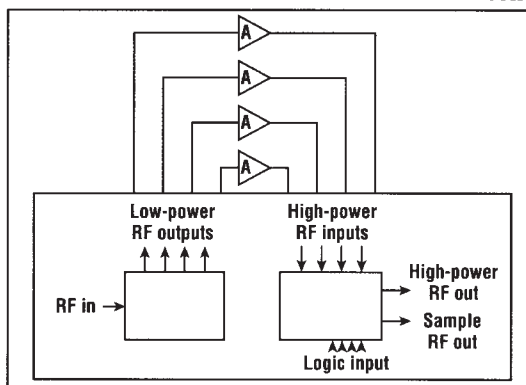
The power divider/combiner (see figure) is designed for use with "bookshelf" cellular base-station amplifiers—those modular amplifiers that slide into a mainframe housing. The unit essentially splits an input signal into multiple output signals that can then be boosted by the bookshelf amplifiers. Amplifiers are added as needed, based on the coverage requirements of a base station. The individual contributions of the amplifiers are combined to achieve a high output level with low loss. The assembly, which is also available as a dedicated high-power combiner (without the front-end divider), also provides a low-level sample output for test purposes.

The divider/combiner draws upon the company's extensive expertise in high-power stripline circuit technology. According to Product Manager Richard Palker, the low-loss switchable power divider/combiner "combines our advanced switch and microwave tech-

nologies in an integrated assembly to minimize losses." Developed by an engineering team that included Palker and Product Manager John Mruz, the low-loss divider/combiner enables designers to replace the active equalization and feedforward techniques that are commonly used to maximize the power levels of combined amplifiers in cellular and personal-communications-services (PCS) base-station applications.

The low-loss switchable power divider/combiner features 1.40:1 maximum VSWR from 869 to 894 MHz. Phase deviation between ports is minimal, at ± 2 deg. The unit can handle up to 60-W cold-switched average power into each of its four input ports, with an output rating of 240-W average power (see table). The peak output-power rating is 6000 W (for a peak-to-average rating of 14 dB).

The low-loss assembly employs pulse-latching, break-before-make switch actuation. It requires an actuating voltage of +15 VDC and an actuating current of 3.5 A for 50 ms. The unit's low-loss, high-isolation switches are rated for 100,000 operating cycles. **Narda Microwave-East, L3 Communications, 435 Moreland Rd., Hauppauge, NY 11788; (516) 231-1700, FAX: (516) 231-1480, e-mail: richard.palker@L-3COM.com**



The switchable power divider/combiner is ideal for adding the separate contributions of modular base-station amplifiers.

The power divider/combiner at a glance

PARAMETER	SPECIFICATION
FREQUENCY RANGE	869 to 894 MHz
INSERTION LOSS	0.5 dB maximum
AVERAGE POWER-HANDLING CAPABILITY (EACH OF 4 INPUT PORTS)	60 W maximum
INPUT / OUTPUT VSWR	1.40:1 maximum

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